



# UNITED STATES PATENT AND TRADEMARK OFFICE

AK  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,420	02/11/2002	Tony Mule'	62004-1880	6999

24504 7590 08/07/2003

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
100 GALLERIA PARKWAY, NW  
STE 1750  
ATLANTA, GA 30339-5948

[REDACTED] EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
	2882

DATE MAILED: 08/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No. 10/074,420	Applicant(s) MULE' ET AL. <span data-bbox="1416 73 1491 82">AK</span>
	Examiner Thomas R Artman	Art Unit 2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### **Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 11 February 2002.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)  Claim(s) 1-30 is/are pending in the application.  
4a) Of the above claim(s) 16-28 is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-15, 29 and 30 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)  The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All b)  Some \* c)  None of:

1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)  The translation of the foreign language provisional application has been received.

15)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1)  Notice of References Cited (PTO-892) 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948) 5)  Notice of Informal Patent Application (PTO-152)  
3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) 35. 6)  Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-15 and 29-30, drawn to an optical waveguide, classified in class 385, subclass 129.
- II. Claims 16-28, drawn to a method of manufacture, classified in class 438, subclass 031.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the waveguide with an air-gap cladding of Invention I can be made by another process, such as flip-chip wafer bonding.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Chris Linder, Reg. No. 47,751, on July 22<sup>nd</sup>, 2003, a provisional election was made without traverse to prosecute the invention of an optical waveguide, claims 1-15 and 29-30. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

*Claim Objections*

Claims 4, 5, 12 and 13 are objected to because it contains a product by process limitation and therefore does not carry patentable weight. Appropriate correction is required.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 6, 7, 9 and 14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3 and 6 of copending Application No. 10/074067.

Regarding claim 1, the waveguide having a waveguide core is identically disclosed in the conflicting application's claims 1 and 6. The conflicting claims have the additional structure of an air-gap cladding.

Regarding claim 2, although the conflicting claims are not identical, they are not patentably distinct from each other because the conflicting application requires the air-gap cladding to "engage" a portion of the waveguide core, where the present application requires the air-gap cladding to be disposed "around" a portion of the waveguide core. Though the scope of "engage" is narrower than "around," one skilled in the art would recognize that, if the cladding

“engages” a portion of the core, then it is also “around” a portion of the core. Therefore, the scopes of the inventions are obvious variants with no substantial deviation in scope.

Regarding claims 6 and 14, (claim 6 follows claims 1 and 2 in dependency, and claim 14 follows claim 1), the limitation of “a coupling element adjacent to the waveguide core” is anticipated by the conflicting application’s claim 3, which recites “at least one coupling element disposed adjacent to the waveguide core.”

Further regarding claim 14, the conflicting application’s claims 1 and 3 have the additional limitation of an air-gap cladding.

Regarding claim 7, (following claim 1 in dependency), the limitation of “the waveguide core includes at least one coupling element” is anticipated by the conflicting application’s claim 2, which recites “the waveguide core includes at least one coupling element.” As stated in the previous paragraph, claims 1 and 2 of the conflicting application recites the additional structure of an air-gap cladding.

Regarding claim 9, (following claims 1 and 7 in dependency), although the conflicting claims are not identical, they are not patentably distinct from each other because the conflicting application’s claim 1 requires the air-gap cladding to “engage” a portion of the waveguide core, where the present application’s claim 9 requires the air-gap cladding to be disposed “around” a portion of the waveguide core. Though the scope of “engage” is narrower than “around,” one skilled in the art would recognize that, if the cladding “engages” a portion of the core, then it is

also “around” a portion of the core. Therefore, the scopes of the inventions are obvious variants with no substantial deviation in scope.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Horiguchi (US 3,950,073).

Regarding claim 1, Horiguchi discloses a waveguide with a waveguide core (item 1 of Fig.1)

Regarding claim 2, Horiguchi discloses an air-gap cladding (item 3) that is disposed around a portion of the waveguide core.

Claims 1, 2, 4, 12, 13 and 15 rejected under 35 U.S.C. 102(b) as being anticipated by Boysel (US 5,278,925).

Regarding claim 1, Boysel discloses a waveguide with a waveguide core (Fig.1, item 16).

Regarding claim 2, Boysel discloses an air-gap cladding layer around a portion of the core (etched-away portion of layer 18).

Regarding claims 4 and 12, Boysel discloses a first sacrificial layer (remaining portions of layer 18) that defines an air-gap cladding layer.

Regarding claim 13, Boysel discloses a second sacrificial layer (remaining portions of layer 18) that defines an air-gap layer.

Regarding claim 15, Boysel discloses a lower cladding layer (item 14) adjacent to the waveguide core.

Claims 1-3, 10-11 and 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Wojnarowski (US 5,562,838).

Regarding claim 1, Wojnarowski discloses a waveguide with a waveguide core (item 82 of Fig.9).

Regarding claim 2, Wojnarowski discloses an air-gap cladding layer around a portion of the core (item 106).

Regarding claims 3 and 10, Wojnarowski discloses a lead (item 92) with an air layer (item 106) disposed substantially under a portion of the lead.

Regarding claim 11, Wojnarowski discloses a coupling element (item 108) that couples light from the laser diode aperture (item 84) to the waveguide core (col.8, line 64, to col.9, line 4).

Regarding claim 29, Wojnarowski's device performs the method, including:

- 1) coupling an optical signal to a waveguide in a wafer-level electronic package, and
- 2) communicating the optical signal through the waveguide.

Regarding claim 30, Wojnarowski's device has the structure, including:

- 1) a waveguide with a waveguide core, and
- 2) an air-gap cladding layer around a portion of one of the waveguide cores.

Claims 1, 2, 6-9 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Schultz (US 6,285,813).

Regarding claim 1, Schultz discloses a waveguide with a waveguide core (Fig.1A, item 103, or Fig.1B, item 123).

Regarding claim 2, Schultz discloses that the waveguide core can have an air "cover" as a cladding layer (col.3, line 40) that is around a portion of the core.

Regarding claim 6, Schultz discloses a coupling element adjacent to the waveguide core in Fig.1A.

Regarding claim 7, Schultz discloses the waveguide core including at least one coupling element (item 106).

Regarding claim 8, Schultz discloses that the coupling element is a volume grating.

Regarding claim 9, Schultz discloses that the waveguide core can have an air "cover" as a cladding layer (col.3, line 40) that is around a portion of the core.

Regarding claim 14, Schultz discloses a coupling element adjacent to the waveguide core (item 106 of Fig.1A).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski and in view of Boysel.

Wojnarowski does not include a sacrificial layer that defines an air-gap layer. The layer is formed by other means.

Boysel discloses a sacrificial layer (remaining portions of sacrificial layer 18 of Fig.1) that provides an alternative to defining an air-gap layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wojnarowski to use a sacrificial layer as taught by Boysel in order to reliably provide an air-gap layer, since the use of sacrificial layers is a well-known, well-understood and reliable method used to create gaps in multilayered structures.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fan (US 5,054,872) teaches the use of sacrificial layers in optical waveguides that are used in opto-electronic applications. Bhagavatula (US 5,253,319) teaches optical waveguides with air-gap cladding layers. Kimerling (US 2002/0076188) teaches waveguides with air-gap cladding layers. Ramdani (US 6,493,497) teaches the use of air as a cladding layer

Art Unit: 2882

and integration with opto-electronic devices. Kragl (US 5,434,935) teaches the use of gratings as couplers that use air cladding layers in optical waveguides. Wojnarowski (US 5,737,458) teaches waveguides with air cladding layers and use in opto-electronic systems. Koh (US 5,416,861) teaches grating couplers for planar waveguides with an air-gap layer in between.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Thomas R. Artman  
Patent Examiner  
July 25, 2003

*JKS*

*Edward Glick*  
EDWARD J. GLICK  
Supervisory Patent Examiner  
TECHNOLOGY CENTER 2800